REMARKS

Applicants have amended their claims in order to further clarify the definition of the present invention. Specifically, each of claims 9, 30 and 67, the sole independent claims in the application presently being considered on the merits therein, has been amended to delete the recitation, the second polymer material is "different from the first polymer material". In addition, each of claims 9, 30 and 67 has been further amended to clarify that the cross-over points, after, e.g., the thermal bonding (for example, in the produced fiber-containing material), are points where the first segments cross each other; and to recite that in the fiber-containing material the second polymer material of the second segment is substantially only at the cross-over points where the first segments cross each other. Claim 9 has been still further amended to recite that the first and second segments are at least partially split prior to melting of the second segments. In light of these amendments to independent claims 9, 30 and 67, claims 23, 31, 63, 70 and 71 have been canceled without prejudice or disclaimer, and dependency of claim 64 has been amended. In addition, claim 61 has been canceled without prejudice or disclaimer.

Applicants are adding new claims 72-77 to the application. Claims 72-74, dependent respectively on claims 9, 30 and 67, recite that the first and second polymer materials are different types of polymer materials. Claims 75 and 76, dependent respectively on claims 30 and 67, recite complete melting of the

polymer material; and claim 77 recites the subject matter of claim 62, but is dependent on claim 30.

The indication in Item 6 on page 3 of the Office Action mailed October 24, 2001, that Figs. 1, 2a and 2b should be designated by a legend such as "Prior Art", is noted. As these Fig. 1, 2a and 2b were submitted as background information, for clarifying explanation of the present invention, these Figs. 1, 2a and 2b are being designated as --Background Information--. In a separate paper filed concurrently herewith, Applicants are requesting approval by the Examiner of amendments to Figs. 1, 2a and 2b, to label each of these figures by the legend --Background Information--. In view thereof, the suggestion by the Examiner in Item 6 on page 3 of the Office Action mailed October 24, 2001, is moot.

The objection to the disclosure as set forth in Item 7 on page 3 of the Office Action mailed October 24, 2001, is respectfully traversed, particularly in light of the following comments. That is, as is clear from Applicants' specification as a whole, the first polymer material is a relatively high-melting-temperature polymer material and the second polymer material is a relatively low-melting-temperature polymer material. As can be appreciated, the high melting temperature and low melting temperature polymer materials are relative, and, as is clear from page 14, lines 17-22 of Applicants' specification, "there is a wide overlap between polymer materials for the low melt temperature segments

and for the high melt temperature segments, as some of the higher melt temperature polymers, among the listed low melt temperature polymers, may be used in combination with even lower melt temperature polymers". In view thereof, and particularly in view of the description concerning overlap, it is respectfully submitted that Applicants' disclosure as a whole is clearly consistent in reciting various material as high melting temperature and low melting temperature polymer materials, depending on the other polymer material used in a multi-component fiber.

The question by the Examiner as to which group does PET belong to, in item 7 on page 3 of the Office Action mailed October 24, 2001, is noted. In view of the disclosed "wide overlap", it is respectfully submitted that PET can be either the first polymer material or the second polymer material, depending on the specific material used as the other of the first and second polymer materials. Accordingly, it is respectfully submitted that the present specification is clear, with respect to classification of PET in connection with the present invention. Reconsideration and withdrawal of the objection to the specification as in Item 7 on page 3 of the Office Action mailed October 24, 2001, are respectfully requested.

The rejection of claim 12 as set forth in Item 9 bridging pages 3 and 4 of the Office Action mailed October 24, 2001, is noted. In view of present amendments to claim 12, to recite a weight range of 0.3 to 40 ounces per square

yard, this rejection of claim 12 is moot. As to the present range, note, for example, page 20, lines 10-12, of Applicants' specification.

Rejection of claim 61 under the first paragraph of 35 USC 112, as set forth in Item 10 on page 4 of the Office Action mailed October 24, 2001, is moot, in view of present canceling of claim 61.

Rejection of claims 9-22, 24-31 and 61-72 under the second paragraph of 35 USC 112, as being indefinite, as set forth in Items 12 and 13 on pages 4 and 5 of the Office Action mailed October 24, 2001, is noted. Initially, note that claim 22 has been previously canceled and claim 23 is presently pending; accordingly, it is respectfully submitted that the listed claims being rejected under the second paragraph of 35 USC 112 are at least improper in setting forth claim 22.

In any event, the phrase "different" has been deleted from each of claims 9, 30 and 67. That is, as is clear from Applicants' original disclosure, an important feature is the materials respectively of the first and second segments have different melt temperatures (specifically, the first polymer material having a higher melt temperature than that of the second polymer material). In view of present amendments to claims 9, 30 and 67, it is respectfully submitted that the rejection of claims as set forth in Items 12 and 13 on pages 4 and 5 of the Office Action mailed October 24, 2001, is moot. Noting claims 72-74, clearly this rejection under the second paragraph of 35 USC 112 is <u>not</u> applicable to claims 72-74.

Rejection of claim 61 as indefinite, as set forth in Item 14 on page 5 of the Office Action mailed October 24, 2001, is noted. This rejection is moot in light of present canceling of claim 61.

Applicants respectfully submit that all of the claims now presented for consideration by the Examiner patentably distinguish over the teachings of the references as applied by the Examiner in the Office Action mailed October 24, 2001, that is, the teachings of the U.S. patents to Murase, et al., No. 5,718,972, to Heagle, et al., No. 5,290,449, and to Hwang, No. 4,514,455, under the requirements of 35 USC 102 and 35 USC 103.

Initially, note that all of the present claims being considered on the merits in the above-identified application recite that the second polymer material, of the second segments, is substantially only at the cross-over points where the first segments cross each other. Moreover, note that, for example, claims 23, 31, and 71 were not rejected over the teachings of Murase, et al. See Item 16 on pages 5-7 of the Office Action mailed October 24, 2001. In view of present amendments to claims 9, 30 and 67, it is respectfully submitted that the rejection over the teachings of Murase, et al. has clearly been overcome.

As for the remaining prior art rejections, it is respectfully submitted that the applied references, Heagle, et al. or Hwang, would have neither taught nor would have suggested such fiber-containing material as in the present claims, made from a plurality of multi-component fibers having at least first and second

segments respectively made of first and second polymer materials, the first segments having cross-over points with each other, where the first segments cross each other, and wherein the second polymer material, having a lower melt temperature than that of the first polymer material, of the second segments, has been melted and is substantially only at the cross-over points where the first segment cross each other (see claims 1, 30 and 67), to act as a binder of the fiber-containing material (see claim 30).

Moreover, it is respectfully submitted that these references would have neither taught nor would have suggested the fiber-containing material as in the present claims, having the cross-over points of the first segments with each other, where the first segments cross each other, and wherein the first and second segments have been at least partially split from each other prior to melting of the second segments. See claims 9 and 67; note also claim 20, reciting that the second segments have been completely split from the first segments prior to melting of the second segments.

In addition, it is respectfully submitted that these references as applied by the Examiner would have neither taught nor would have suggested such fiber-containing material as in the present claims, including wherein the second polymer material has been completely melted in forming the material (note claims 13, 75 and 76); and, moreover, is the sole binder of the fiber-containing material (see, e.g., claim 14).

Furthermore, it is respectfully submitted that these references would have neither taught nor would have suggested such fiber-containing material as in the present claims, wherein the second polymer material, of the second segments, substantially encapsulates the cross-over points and is substantially only at the cross-over points. See claim 62. Note also claims 67 and 77.

In addition, it is respectfully submitted that these applied references would have neither disclosed nor would have suggested such fiber-containing material as in the present claims, made by the recited process including wherein the second segments are split at least partially from the first segments, after collecting a plurality of multi-component fibers having at least the first and second segments; and, after the splitting, thermally bonding the first segments by melting the second polymer material of the second segments, the second polymer material of the second segments being melted so as to encapsulate the first segments at the cross-over points where the first segments cross each other, the second polymer material of the second segments being substantially only at the cross-over points where the first segments cross each other. See claim 67. Note also claim 68, reciting that the second polymer material is the only bonding agent thermally bonding the first segments.

The invention, as being considered on the merits in the present application, is directed to fiber-containing materials (for example, fibrous materials, such as woven fabrics, knit fabrics, yarns, webs and non-woven

fabrics). It has long been desired to provide bonded fibrous materials, including non-woven materials, having increased strength and increased softness. According to various techniques for forming such bonded fibrous materials, a binder fiber is utilized having an adhesive sheath, which is softened so as to bind fibers thereto after the softened adhesive has hardened. Note, for example, page 1, line 19 to page 2, line 14, of Applicant' specification. In this structure, there is excessive adhesive, and there is undesirable bonding of more than just the cross-over points (that is, potential bonding sites) of the structure.

It has also been known to use standard size binder fibers which are melted, forming melted adhesive, to provide the bonded structure. However, an excessive amount of binder at one spot occurs, as described in the paragraph bridging pages 2 and 3 of Applicants' specification.

Fiber structures composed wholly or in part of completely or partially split multi-component fibers were known, and it was known to bond the fibers at the points of intersection through application of heat. Note the last full paragraph on page 3, and the paragraph bridging pages 3 and 4, of the present specification.

However, in prior techniques, with improved (increased) strength there occurred decreased softness, and with increased softness there occurred decreased strength. Thus, it was still desired to provide fibrous material having both improved strength and softness, with less wasted binder material.

Against this background, Applicants provide such fiber-containing

material having the desired improvement in both strength and softness simultaneously, and further with less wasted binder material and a more even distribution of binder. Applicants have found that by utilizing multi-component fibers including at least first and second segments respectively of first and second polymer materials of different melt temperatures, especially with the segments being at least partially split from each other and then the lower melt temperature polymer material (that is, polymer material of the second segments) being melted to provide a binder of the fiber-containing material, the melted second polymer material, of the second segments, being substantially only at the cross-over points of the first segments of first polymer material of higher melt temperature, e.g., encapsulating the cross-over points, objectives according to the present invention are achieved. That is, a fiber-containing material of high strength and good softness is achieved. With the binding polymer material, of the second segments, being melted and being substantially only at the cross-over points of the first segments (more especially, encapsulating the cross-over points), improved strength is achieved with use of less binder. In addition, with the melted second polymer material substantially only at the cross-over points where the first segments cross each other, there is less binder material waste; and, moreover, softness is improved. Furthermore, because more bonding sites are formed, e.g., at the cross-over points of the first segments, a more even appearance is achieved. Note, in particular, the sole full paragraph on page 24,

and the paragraph bridging pages 24 and 25, of Applicants' specification. Note also the paragraph bridging pages 8 and 9 of Applicants' specification.

Heagle, et al. discloses blood filter material, for filtering leucocytes from a fraction of or whole blood, comprising a shape-sustaining laid textile web having a thickness of at least 1 millimeter and a bulk density of between about 0.05 and 0.4 g/cm^3. The web has a plurality of interlocked textile fibers with average deniers between about 0.05 and 0.75 and an average length between about 3 and 15 millimeters. The textile fibers are substantially uniformly distributed in the web so as to form a matrix of the textile fibers with spaces between adjacent interstices of interlocked fibers. A plurality of fibrillated particles of polymeric material having a surface area of at least 5 square meters per gram are substantially disposed within the spaces of the matrix. See column 3, lines 20-36. This patent further discloses that the web has added thereto a thermoplastic binder disposed at least at cross-over portions of the textile fibers and glass fibers in the filter material, when glass fibers are included in the filter material, with amount of the binder being about 0.1 to 10% by weight of the web, the binder preferably being applied to the formed web as an emulsion thereof. See column 3, lines 44-49. Note also column 6, lines 31-46. This patent clarifies distinctions between the glass fibers and the textile fibers (see column 12, lines 38-47), and discloses contents of the larger matrix textile fibers and smaller matrix glass fibers (note column 12, lines 56-68). The binder is utilized to

ensure the securing of the glass fibers into the web. See the last full paragraph in column 8, and the paragraph bridging columns 8 and 9 of this patent. Matrix glass fibers are secured by having the binder at cross-over positions of the matrix textile fibers and matrix glass fibers. Note column 9, lines 8-18. It is emphasized in Heagle, et al. that to ensure securing of the glass fibers into the web, the separate binder is required. Note particularly column 8, lines 44-54 of Heagle, et al.

Initially, it is emphasized that Heagle, et al. discloses use of a binder when glass fibers are utilized, to secure glass fibers to the textile fibers. It is respectfully submitted that this patent does not disclose, nor would have suggested, and in fact would have taught away from, structure as in the present claims wherein the second polymer material, of the second segments, is substantially only at the cross-over points where the first segments cross each other. That is, the first segments are made of a first polymer material; and it is respectfully submitted that the teachings of Heagle, et al., describing binder to secure glass fibers into the web, would not have taught nor would have suggested the binder at cross-over points where the first segments cross each other.

The contention by the Examiner that Heagle, et al. teaches binder being substantially only at the cross-over points, is noted. It is respectfully submitted that according to the teachings of Heagle, et al., the binder is at cross-over points

of the matrix textile fibers and matrix glass fibers, and would have taught away from structure wherein the second polymer material, of the second segments, is substantially only at the cross-over points where the first segments cross each other, or the encapsulation recited in the present claims.

In addition, noting particularly that Heagle, et al. is concerned with securing glass fibers in the filter material, by the binder, it is respectfully submitted that this patent would have neither taught nor would have suggested advantages achieved by the present invention, of both improved strength and softness, with binder material substantially only at the cross over points where the first segments cross over each other.

Furthermore, it is respectfully submitted that further improved strength and softness are achieved in splitting the first and second segments at least partially from each other prior to melting of the second segments. Note claim 9; see claim 67. It is respectfully submitted that this prior splitting, with subsequent melting/bonding, provides a structure having, for example, the second polymer material of the second segments substantially only at the cross-over points where the first segments cross each other, providing more uniformly dispersed binder at cross-over points. It is respectfully submitted that Heagle, et al. would have neither taught nor would have suggested this structure formed by processing according to the present invention, and advantages achieved thereby.

Hwang discloses a composite nonwoven fabric particularly suited for use

as an apparel insulating interliner, which includes a batt of staple polyester fibers that is attached to a nonwoven sheet of continuous polyester filaments. See column 1, lines 10-13. Note also column 2, lines 54-61. This patent discloses that in addition to light and heavy staple fibers, the batt optionally may include as much as 15% or more of binder fibers; and that upon heat treatment at temperature above their melting point, the binder fibers loose their identity as fibers by coalescing on the surfaces or at the cross-overs of the other fibers to bond the batt. This patent discloses that the bonding, though not necessary, enhances the dimensional stability of the staple fiber batt. See column 4, lines 5-12. Note also that this patent requires attachment of the batt to a nonwoven sheet of polyester continuous filaments in a particular way (see column 3, lines 33-37); and specifies that the binder preferably is activated by heating the batt after it has been stitched to the non-woven sheet, although the batt may be bonded at an earlier stage. See column 5, lines 27-31.

Initially, it is emphasized that Hwang discloses the binder fibers coalescing on the surfaces or at the cross-overs of the other fibers to bond the batt. It is respectfully submitted that this patent does not disclose, nor would have suggested, structure as in the present invention, including wherein the second polymer material, of the second segments, is substantially only at the cross-over points where the first segments cross each other.

Moreover, it is respectfully submitted that Hwang requires a non-woven

sheet. Particularly in view thereof, it is respectfully submitted that Hwang would have neither taught nor would have suggested structure as in the present invention, having the second polymer material substantially only at the cross-over points where the first segments cross each other, or the encapsulation at the cross-over points, providing both improved softness and improved strength in the formed product.

The contention by the Examiner on page 9 of the Office Action mailed October 24, 2001, that the melt binder fiber in Hwang "would inherently concentrate at the cross-over points of the other fibers", and "would also inherently be substantially only at the cross-over points and encapsulate the cross-over points", is respectfully traversed. It is emphasized that Hwang discloses that the fibers coalesce, inter alia, on the surfaces of the other fibers. It is respectfully submitted that this disclosure clearly establishes that the binder material would not "inherently" be "substantially only at the cross-over points and encapsulate the cross-over points". There is no disclosure of encapsulation in Hwang.

Where else would it go?

The contention by the Examiner in the last paragraph on page 9 of the Office Action mailed October 24, 2001, that the processing limitations "are not given patentable weight at this time", is noted. It is respectfully submitted, as described earlier, that the specific processing wherein the fibers are split and then melted provides a different product, with more uniformly dispersed binder

more uniformly dispersed at cross-over points, and it is respectfully submitted that the teachings of Hwang would have neither taught nor would have suggested the presently claimed structure, and advantages achieved thereby in both increased strength and increased softness.

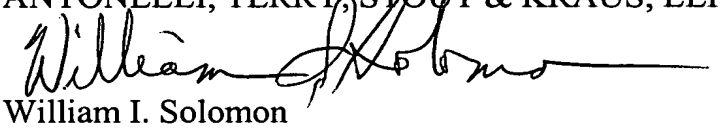
In view of the foregoing comments and amendments, reconsideration and allowance of all claims remaining in the application are respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current Amendment. This marked-up version is on the attached pages, the first page of which is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account No. 01-2135 (Case No. 709.36924X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP



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VERSION WITH MARKINGS TO SHOW CHANGES MADE IN THE CLAIMS

Please cancel claims 23, 31, 61, 70 and 71 without prejudice or disclaimer, and amend the claims remaining in the application as follows:

9. (Twice Amended) Fiber-containing material made from a plurality of multi-component fibers, each multi-component fiber including at least first and second segments, the first and second segments being made respectively of a first polymer material and a second polymer material [different from the first polymer material], the first polymer material having a higher melt temperature than that of the second polymer material, [the first and second segments having been at least partially split from each other,] the second segments having been melted and being a binder of the fiber-containing material, the first and second segments having been at least partially split from each other prior to melting of the second segments wherein the fiber-containing material has cross-over points of the first segments with each other, where the first segments cross each other, and wherein the second polymer material, of the second segments, is [concentrated] substantially only at the cross-over points where the first segments cross each other.

12. (Twice Amended) Fiber-containing material according to claim 11,

wherein the non-woven fabric has a weight of [0.1] 0.3 to 40 ounces per square yard.

20. (Twice Amended) Fiber-containing material according to claim 9, wherein the second segments have been completely split from the first segments prior to melting of the second segments.

30. (Twice Amended) Fiber-containing material made from a plurality of multi-component fibers, each multi-component fiber including at least first and second segments, the first and second segments being made respectively of a first polymer material and a second polymer material [different from the first polymer material], the first polymer material having a higher melt temperature than that of the second polymer material, the first segments of the plurality of multi-component fibers having cross-over points with each other, where the first segments cross each other, and wherein second polymer material, of the second segments, [having] has been melted and [being concentrated] is substantially only at the cross-over points where the first segments cross each other, to act as a binder of the fiber-containing material.

64. (Amended) Fiber-containing material according to claim [63] 9, wherein the first and second segments have been at least partially split by

differential shrinkage of the first and second polymer materials.

67. (Amended) Fiber-containing material, made by a process comprising the steps of:

collecting a plurality of multi-component fibers, the multi-component fibers having at least first segments and second segments respectively made of first and second polymer materials [different from each other], the first polymer material having a higher melt temperature than that of the second polymer material;

splitting the second segments at least partially from the first segments; and

after said splitting, thermally bonding the first segments, to form the fiber-containing material, by melting the second polymer material of the second segments,

wherein in the collecting step, the plurality of multi-component fibers form cross-over points with each other, and in the thermal bonding step the second polymer material of the second segments is melted so as to encapsulate the first segments at cross-over points of the first segments, the first segments crossing each other at the cross-over points of the first segments after the thermal bonding, and

wherein after the thermal bonding the second polymer material of the second segments is substantially only at the cross-over points of the first segments, where the first segments cross each other.